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Smart Vehicle Parking Assistance System (SVPAS)

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ABSTRACT: The number of vehicles is increasing over the decay very fast as the standard of living has been raised. Finding parking availability for a specific time period is a very tedious job in urban areas. So, there is a need for a monitoring system for vehicles from unknown parking and security reasons. Many residential buildings administrations, tolls, business complexes, and parking spaces in India lack an automated car parking system and vehicle monitoring for security purposes. Many of the commercial and residential places face an essential problem of illegal car/vehicle parking inside their premises.

The Indian government now focusing on the smart city project, already they published city name for an upcoming smart city project. In smart city application, intelligent transportation system (ITS) plays an important role- in that finding parking place, specifically for the car owner to avoid time computation, as well as congestion in traffic is going to be very important.

In this regard, an affordable solution that caters to the Indian markets can be made using the Image Processing method of Open CV. In this project, we propose an intelligent car parking system for the smart city using Python and OpenCv.

KEYWORDS: Smart Parking System, Open CV, Python, Image Processing.

I. INTRODUCTION

Vehicles have always been an essential part of human civilization; the rising affluence of urbanization of India has made the ownership of vehicles a necessity. This has resulted in numerous problems in vehicle identification and monitoring. Nowadays there is overcrowding in parking areas due to the increasing number of vehicles. In the proposed system there is a method to detect vehicle monitoring in real-time without any human supervision. The system has been designed for smooth and effortless execution in real-time to overcome all the problems.

Parking can be simplified by the installation of cameras at a parking lot. Personal Computer or Laptop used as system for Image analysis, acquire image/video from web camera or USB camera. Then from those images finding empty space with help of Python/OpenCV software.

SVPAS is a real-time parking management system to help people find parking spots near malls, shopping areas, cinema house etc. It is a automated parking availability management system that detects any available parking space within a certain area of interest and then a text message is sent to let you know whenever there's a vacancy in the nearby street parking or community parking.

II. LITERATURESURVEY

Sr.No	Title of Paper	Author name	Innovation/Technology	Study
1	Image Handling and Processing for Efficient Parking Space Detection and Navigation Aid.Image Handling and Processing for Efficient Parking Space Detection and Navigation Aid.	ChetanSaiTutika, CharanVallapaneni, Karthikeyan B	Understood how to develop a robust and flexible algorithm for vacant parking space detections using the image processing capabilities of OpenCV..	Usage of a portable processing system with recognition algorithm.
2	Automated car parking system commanded by android application	D.J. Bonde, R. Shende, K. Gaikwad, A. Kedari and A. Bhokre	Understood working of system that can regulate and manage the number of cars that can be parked in a given space at any given time based on the availability of parking spot.	Automate car parking
3	OpenCV and Matlab based car parking system module for smart city using circle hough transform	JanakTrivedi, MandalapuSaradaDev, Dave Dhara	Understood an intelligent car parking system for the smart city using Circle Hough Transform concept..	Circle Hough Transform Concept.
4	Smart Parking for Slot Occupancy Detection using Prewitt Edge Detection in OpenCV	Twinkle Singh, SafdarSardar Khan	Understood a system that recognise whether vehicle has been partially parked, fully parked or wrong parked	Prewitt Edge Detection method
5	Automatic Parking Space Detection System	Nazia Bibi , Muhammad Nadeem Majid	Understood a system that classify each block to identify car and intimate the driver about the status of parking either reserved or free.	Segmentation of parking area into blocks.

6	A visual method for the detection of Available Parking Slots	Jian-Yu Chen	Understood a system that detects available parking slots with the help of proposed method.	Parking slot recognition and slot occupancy classification.
7	Real Time Object Detection and Tracking Using Deep Learning and OpenCV	Chandan G, Ayush Jain, Harsh Jain	Application of Deep Learning in image classification.	Understood a model that showed excellent detection and tracking results on the object trained.
8	Automatic Parking Space Detection and Tracking for Underground and Indoor Environments	Jae Kyu Suhr and Ho Gi Jung	Understood a system in which parking slots are detected by estimating parallel line pairs and free spaces are detected by recognizing the positions of parked vehicles as well as pillars.	Parking slot marking-based and free space-based.
9	Smart Urban Parking Detection System	Nastaran Reza NazarZadeh, Jennifer C. Dela	Provide a real time information about the availability of spots in parking spaces through a smartphone application.	Understood a system that is is designed for different types of parking zone.

II. METHODOLOGY

First, the selector starts working on getting the image on which we will select the parking spots. Then we take the first frame provided by the webcam, save it and use the picture to select the spots the video stream in the image variable and determines if the stream was opened successfully, and writes the first frame into frame.jpg. Then we have saved the first frame and opened it in the image variable we can use selectROIs function to mark our parking spots. ROIs are defined as regions of interest and represent a portion of the image on which we will apply different functions and filters to get our results. After selecting all of the parking spots, it needs to transform the variable into a python list and it gets store into .csv file. After selecting parking spots, the detector does image processing work. It then gets coordinates from the .csv file and then builds a new image out of it. After that, it applies the Canny function available in OpenCV and counts the white pixels inside the new image and it will establish a pixel range within the spot that would be occupied and it will finally display a red or green rectangle on the live feed and user is notified.

III. CONCLUSION

Vehicle parking problems continue to prevail and have become a major issue on our campus. This project proposes to develop an automated parking management and assistant System for congested parking spaces and help user to efficiently park their cars. The key concern of our proposed system is to automate the existing manual parking management system with efficient and effective use of parking spaces. This system contributes by reducing the load during peak time on the management authority. The advancements in the internet of things and cloud technologies have given rise to new possibilities in terms of smart cities. Smart parking facilities have always been the core of constructing a smart city. Our future includes the real-time implementation of the proposed system in an effective manner.
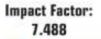
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